

Technical University of Denmark



## Rainbow trout fed diets with varying content of marine and plant origin; how does that influence the outcome of experimental infections of the fry with *Flavobacterium psychrophilum* and *Yersinia ruckeri*?

**Madsen, Lone; Ingerslev, Hans-Christian; Boye, Mette; Dalsgaard, Inger**

*Published in:*

Seventh International Symposium on Aquatic Animal Health. Proceedings

*Publication date:*

2014

*Document Version*

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Madsen, L., Ingerslev, H-C., Boye, M., & Dalsgaard, I. (2014). Rainbow trout fed diets with varying content of marine and plant origin; how does that influence the outcome of experimental infections of the fry with *Flavobacterium psychrophilum* and *Yersinia ruckeri*? In Seventh International Symposium on Aquatic Animal Health. Proceedings [32e]

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

**32e. Rainbow trout fed diets with varying content of marine and plant origin; how does that influence the outcome of experimental infections of the fry with *Flavobacterium psychrophilum* and *Yersinia ruckeri*?**

Lone Madsen<sup>1\*</sup>, Hans-Christian Ingerslev<sup>2</sup>, Mette Boye<sup>3</sup>, Inger Dalsgaard<sup>4</sup>

<sup>1</sup> National Veterinary Institute, Technical University of Denmark (DTU VET), Bülowsvej 27, 1870 Frederiksberg C, Denmark loma@vet.dtu.dk

<sup>2</sup> DTU VET hain@vet.dtu.dk

<sup>3</sup> DTU VET mboy@vet.dtu.dk

<sup>4</sup> DTU VET inda@vet.dtu.dk

Feed for rainbow trout aquaculture has traditionally been based on marine resources such as fish meal and fish oil. Because of a shortage of marine resources as well as the growing production of farmed fish, the feed industry has been forced to partially exchange fish meal protein with proteins derived from plants, like soy bean meal. This has been shown to affect the salmonid intestinal mucosa, and in addition, plant-based dietary proteins have been associated with changes in disease susceptibility in salmon and it has been suggested that these special diet types weakens the immune status of the fish.

One major cause for losses in Danish freshwater fish farms is the fry disease rainbow trout fry syndrome (RTFS), caused by the bacterium *Flavobacterium psychrophilum*, and experiences of the fish farmers suggest that the diet type is an important factor for disease development. Enteric redmouth disease caused by *Yersinia ruckeri* is also an economically important disease which causes problems in rainbow trout fry as well as larger fish.

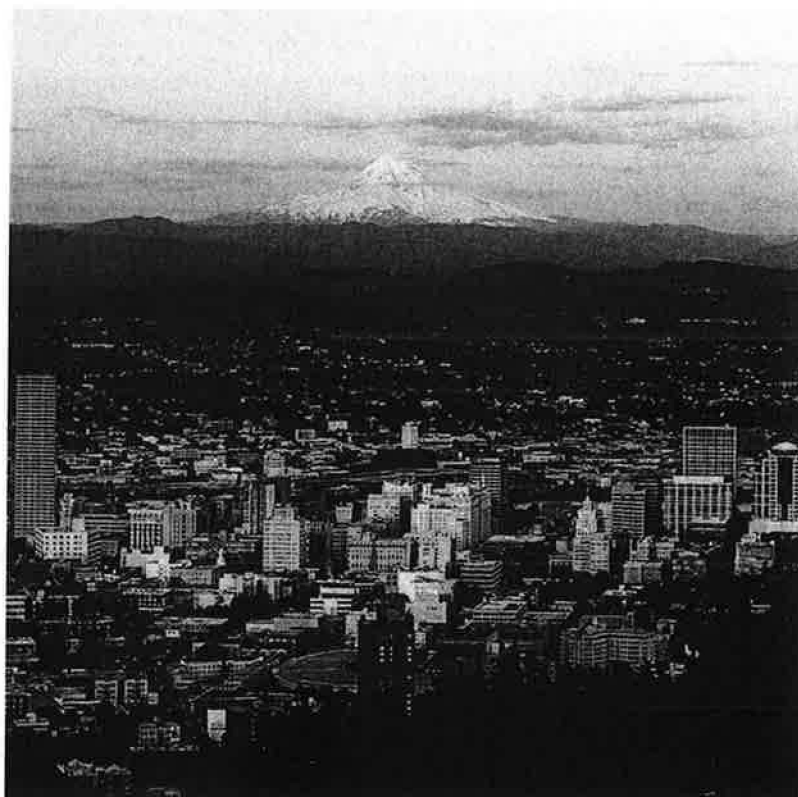
Rainbow trout were fed from first-feeding with five different diets; diet A with marine fish oil (conventional fry diet), diet B (an organic version of A), diet C with rape seed oil (like B but with rape seed oil exchanging marine fish oil), diet C with pea protein (like B but added pea protein) and diet E with rape seed oil and pea protein. When the fry had reached sizes 1.5 g and 4 g, groups of fish from the five diet groups were infected with *Flavobacterium psychrophilum* and *Yersinia ruckeri*, respectively. An intraperitoneal injection model was used for *F. psychrophilum*, whereas a bath challenge was used for *Y. ruckeri*. Before and after infection, samples were taken from internal organs including the intestine for traditional bacteriology and only intestinal samples for next generation sequencing. The cumulative mortalities among the diet groups did not differ between groups in either of the two infection trials, suggesting that the diets did not have different effects on the immune status of the fish, when it comes to survival after infection, meaning that plant content did not seem to weaken the immune status of the rainbow trout fry. Results of the trial as well as the bacteriological examinations and the next generation sequencing results will be presented.



# **Seventh International Symposium on Aquatic Animal Health**

**August 31 – September 4, 2014 Portland, Oregon, USA**

## **Proceedings**



Fish Health Section